

UNITED STATES PATENT OFFICE

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BLASTING CAP

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8 Claims. (Cl. 52-4)

This invention relates to an improvement in blasting caps, and has for its object produc-
tion of a blasting cap which may be readily and
cheaply loaded and positively detonated, and
which will be of high efficiency in detonating a
blasting charge, as evidenced by the fact that
the caps embodying this invention give excellent
plate tests; i. e. a large hole in the plate and a
good sunburst.

This invention may be applied to either electric
blasting caps, or to ordinary blasting caps fired
with a fuse.

Heretofore, electric blasting caps have been
provided with a compressed charge of mercury
fulminate and a loose charge of mercury ful-
minate in which is embedded the bridgewire, or
have been of the so-called base charge type; i. e.
have been provided with a base charge, not adapt-
ed to be fired by the heat of the bridgewire, com-
prising, for example, picric acid, trinitrotoluene,
tetryl, nitrostarch, ground smokeless powder, etc.,
and a top charge or priming charge detonated
directly from the heat of the bridgewire embed-
ded therein, and which when detonated commu-
nicates detonation to the base charge. Such top
charge may comprise, for example, mercury ful-
minate, lead azide, lead trinitro-resorcinate, etc.

The materials used heretofore for the base
charge have not proved entirely satisfactory for
one reason or another, as for example, because
they are difficult to prepare in a form which will
flow readily, which is a very important factor in
cap loading, or because they are dusty, or, as in
the case of picric acid, they have a tendency to
attack the metal of the cap shell in the presence
of small amounts of moisture, or because they
are of unsatisfactory chemical stability.

In accordance with this invention, it has been
found that a highly satisfactory and efficient
blasting cap, of either the electric or fuse type,
can be produced by the use of i-inositol nitrate,
preferably hexanitrate, as the explosive charge.

In the case of the electric blasting cap a charge
of inositol hexanitrate alone may be used, or as
a base charge underneath a suitable top charge.
In the case of a common cap to be fired with a
fuse inositol hexanitrate as a base charge be-
neath a top charge comprising the usual initiat-
ing or detonating agents, such as mercury ful-
minate, lead azide, lead trinitroresorcinate, etc.
will be used, or alternatively, a top charge com-
prising a mixture which burns without detonat-
ing, and evolves on burning a considerable amount
of heat may be used, since I have found that a
charge of inositol hexanitrate can be caused to

detonate efficiently by heat alone, in contrast to
the commonly used base charges, which do not
detonate by heat alone, but which require super-
position of, or admixture with, an initial detonat-
ing composition.

In the case of an electric blasting cap where
inositol hexanitrate is used as a base charge the
top charge may comprise the usual initiating or
detonating agents, such as mercury fulminate,
lead azide, lead trinitroresorcinate, etc. Where
inositol hexanitrate is used alone the hot flash
from the match head, in which is embedded the
bridgewire (see Initial explosivstoffe, Escales und
Stettbacher, 1917, page 467, which describes
match heads) will be sufficient to cause detona-
tion of the charge of inositol hexanitrate without
the interposition of a top or initiating charge.
By the term match head, I include other shapes
and forms, e. g., a straight bridgewire enclosed
by non-detonating flash compositions.

As illustrative of a satisfactory blasting cap in
accordance with this invention, for example, any
usual or desired form of blasting cap casing may
be charged with a base charge comprising 0.16 g.
of inositol hexanitrate, the base charge being
pressed under a pressure of about 7840 pounds per
square inch, over which, for example, is placed a
priming charge of 0.30 g. of a 90/10 mercury ful-
minate-potassium chlorate mixture, and over
which, in turn, is placed a capsule and an ignit-
ing wafer comprising 0.10 g. of a 70/30 fulminate-
chlorate mixture, pressed at 5600 pounds per
square inch. These caps will be sealed and pro-
vided for firing by a fuse or electrically, in accord-
ance with usual practice.

As illustrative of a satisfactory electric cap in
accordance with this invention, any usual form
of blasting cap casing may be charged with a
single charge comprising .50 g. of inositol hexani-
trate, pressed under a pressure of about 7840
pounds per square inch. In the plug seal of the
cap is placed the usual match head igniter, or
equivalent thereof, and the whole sealed with
pitch. On passing a heating current through the
bridgewire embedded in the match head, the
match head is ignited, and gives a violent flash,
which flash, I have found, is sufficient to bring to
detonation the charge of inositol hexanitrate lo-
cated in the vicinity thereof.

As illustrative of a satisfactory common or fuse
type blasting cap in accordance with this inven-
tion, any usual form of blasting cap may be
charged with a base charge comprising .50 g. of
inositol hexanitrate, the base charge being pressed
under a pressure of about 7840 pounds per square

inch, over which is placed an igniting (but not detonating) charge of 0.30 g. of a match composition comprising barium nitrate, magnesium powder and lead hypophosphite, over which is pressed a perforated capsule. When a fuse is placed in the open end of the cap, ignited, and the spark flashed through the opening in the capsule, the compressed match composition will flash and burn without exploding and will cause the charge of inositol hexanitrate thereunder to detonate.

If desired, in the case of use of inositol hexanitrate with priming (detonating) top charges, the inositol hexanitrate and detonating charge may be mixed intimately. Thus, for example, inositol hexanitrate may be mixed with mercury fulminate or diazo-dinitrophenol, or the like, and then pressed into the cap shell.

The caps made in accordance with this invention will be found to be of superior strength and of special advantage in detonating dynamites. In association with a priming charge of negative oxygen balance, inositol hexanitrate is of particular advantage because it possesses a positive oxygen balance, thus eliminating the necessity, as, for example, with mercury fulminate, for the use of an oxidizing agent, as, for example, potassium chlorate, or the like.

It will now be understood that this invention contemplates, from the broad standpoint, a blasting cap having a base charge, or a single charge of inositol hexanitrate. And it will be understood that the cap otherwise may be of any type or form desired. It will be understood that more specifically the cap may include any primary initiating or non-detonating flash charge, or a detonating charge for initiating or detonating the inositol hexanitrate, and any other ingredients which may be desired. It will be further understood that if a detonating primary charge be used it may in whole or in part be mixed with the inositol hexanitrate or superimposed thereon, all without departing from this invention, and it will be under-

stood further that I do not limit myself to any specified amount of inositol hexanitrate, initiating charge or other ingredients, or to the use of any particular pressure for pressing the charge so long as excessive pressures which will cause dead pressing or bulging of the cap shell are avoided.

This application is a continuation in part of application filed by me, Serial No. 565,705, filed September 28, 1931.

What I claim and desire to protect by Letters Patent is:

1. A blasting cap for initiating commercial explosives including a casing and a charge of i-inositol nitrate in said casing.

2. A blasting cap for initiating commercial explosives including a casing and a charge of inositol hexanitrate in said casing.

3. A blasting cap for initiating commercial explosives including a casing and a charge of i-inositol nitrate and an initiator for the inositol nitrate in said casing.

4. A blasting cap for initiating commercial explosives including a casing and a charge of inositol hexanitrate and an initiator for the inositol nitrate in said casing.

5. A blasting cap for initiating commercial explosives including a casing and a charge of i-inositol nitrate and a detonating initiator for the inositol nitrate in said casing.

6. A blasting cap for initiating commercial explosives including a casing and a charge of i-inositol nitrate and a flash initiator for the inositol nitrate in said casing.

7. A blasting cap including a casing, a charge of i-inositol nitrate and a priming charge therein, the priming charge being superimposed on the inositol nitrate.

8. A blasting cap including a casing, a charge of inositol nitrate and a priming charge therein, the i-inositol nitrate and priming charge being intimately admixed.

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